

Cold Weather Lovers



Despite falling temperatures, the oxygen-rich water and abundant food supplies in winter wetlands provide just the right breeding habitat for many amphibian species.

Text and photographs by Steve Bennett



(Above) Members of the “true frog” family: The gopher frog—our rarest frog species—is endangered in South Carolina and is found predominantly in longleaf pine habitat. Gopher frogs are explosive breeders, emerging from the stump holes, gopher tortoise burrows or other pre-existing holes where they typically make their homes only after large, late winter rainfall events to breed in isolated, fish-free temporary ponds. The bronze frog (inset) is a more common species that spends its entire life near wetlands. The bronze’s breeding time may extend into the spring and early summer.

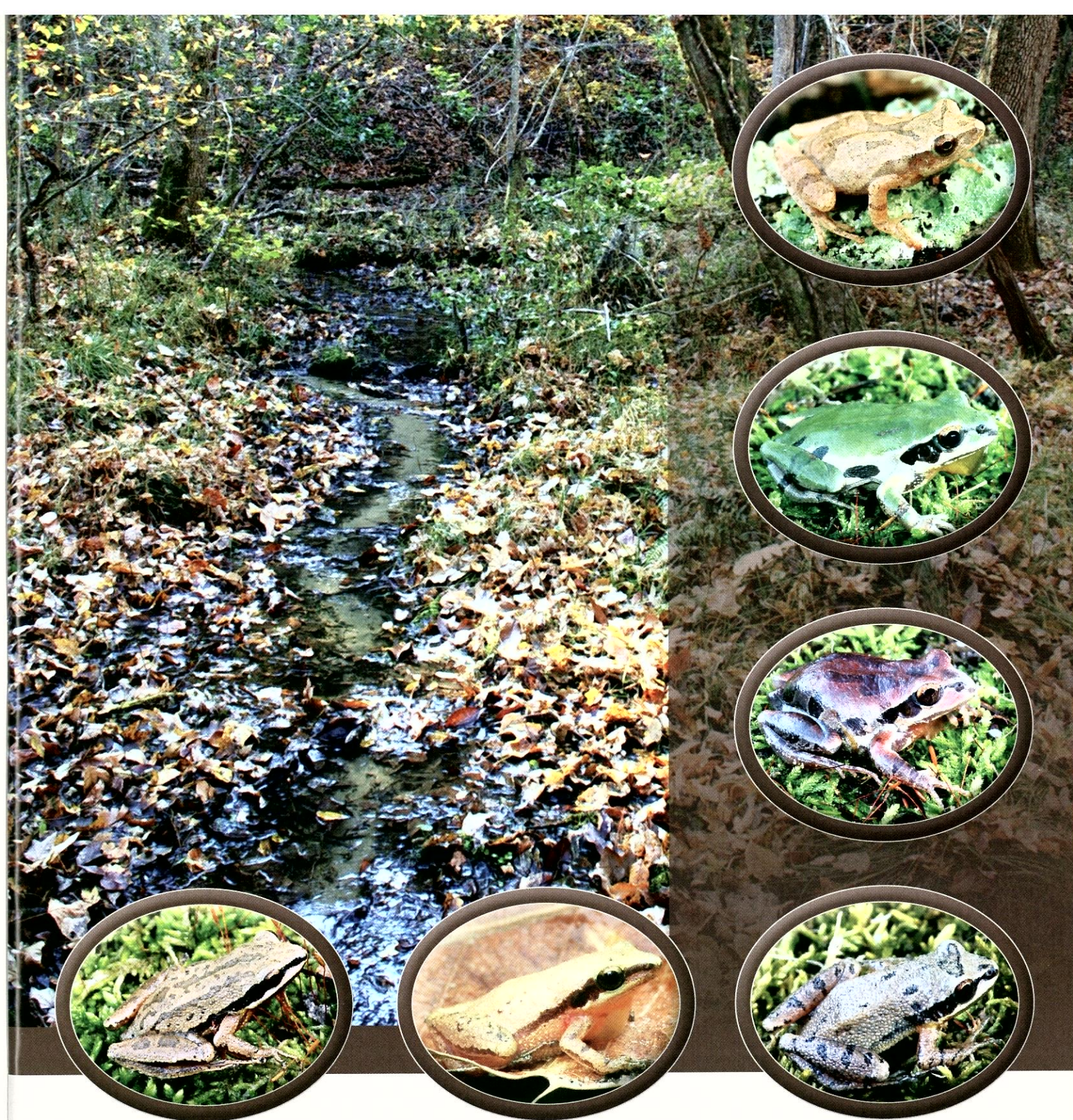
(Previous page) The spade foot toad is named for the sharp-edged, spade-like protuberance on each hind foot that allows it to burrow underground, where it spends most of its time. Spade foots are explosive breeders, moving in great numbers to temporary ponds and wetlands during periods of significant winter rainfall. Breeding events may only happen once every few years—depending on rainfall conditions. Only heavy, torrential rainfalls will trigger the breeding impulse. After such rain events is the only time you will hear the eerie, almost human-like whaa whaa whaa call of this toad, as it is used exclusively to attract breeding females.

Daylight hours constrict, the sun appears to have lost interest in the Northern Hemisphere and the wind grows noticeably colder with the passage of time. Winter approaches, bringing with it a sense of suspended animation, a long period of rest, even finality, as another year draws to an end.

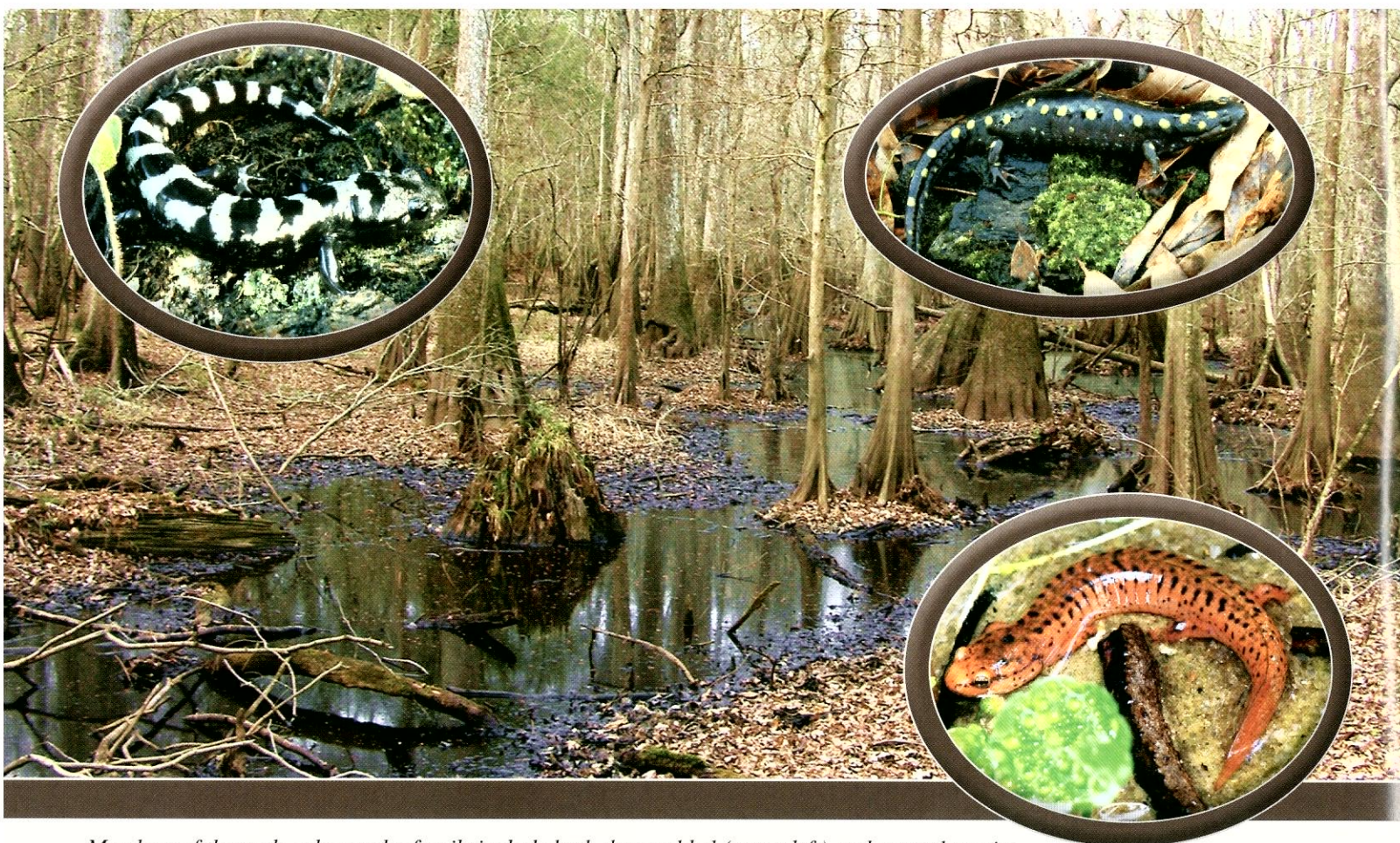
Our perception of winter likely comes from northern Europe and a time long ago when surviving brutal winters was a great challenge. In fact, the word *winter* actually comes from Norse mythology, where “Vetr” personified the winter season just as “Summar” did the summer season. When asked about the difference in these two characters—why Summar was so pleasant

and Vetr was not—the Norse god Odin is said to have replied that Vetr “derived his countenance from his ancestors, who were cruel and cold-hearted.”

Winter, especially in northern climates, can be “cold and cruel,” with sunlight and food becoming scarce. Annual plants and grasses die back and trees drop their leaves. We note changes in animal activity and abundance as many migratory species relocate to warmer regions. Some mammals grow thick coats of fur to protect them from the cold, and many mammals, most reptiles and some amphibians enter periods of winter dormancy or hibernation, only to emerge again as the spring sun warms them. But not everyone sleeps



Members of the chorus frog family include (clockwise from top) the spring peeper, ornate [green & red phases], Southern, little grass and Brimley's frogs. These small, winter-breeding species—closely related to tree frogs—begin moving into breeding sites during winter rains and stay throughout spring. Their calls can be heard beginning in January if weather is mild. Breeding sites for the chorus frogs vary by species and range from flooded hardwood areas along small streams to Carolina bays and flatwoods ponds.



Members of the mole salamander family include both the marbled (upper left) and spotted species. The spotted salamander (upper right) is recognized as South Carolina's state amphibian. Another member of the mole family, the flatwoods salamander (not pictured), is currently listed as a federally threatened species. Red salamanders (lower right) are a common sight in the piedmont and the western portion of the coastal plain of South Carolina and can exhibit considerable variability in markings and coloration. Female red salamanders breed in late fall and early winter—typically in springs and seeps where they lay eggs under woody debris and remain with them until they hatch.

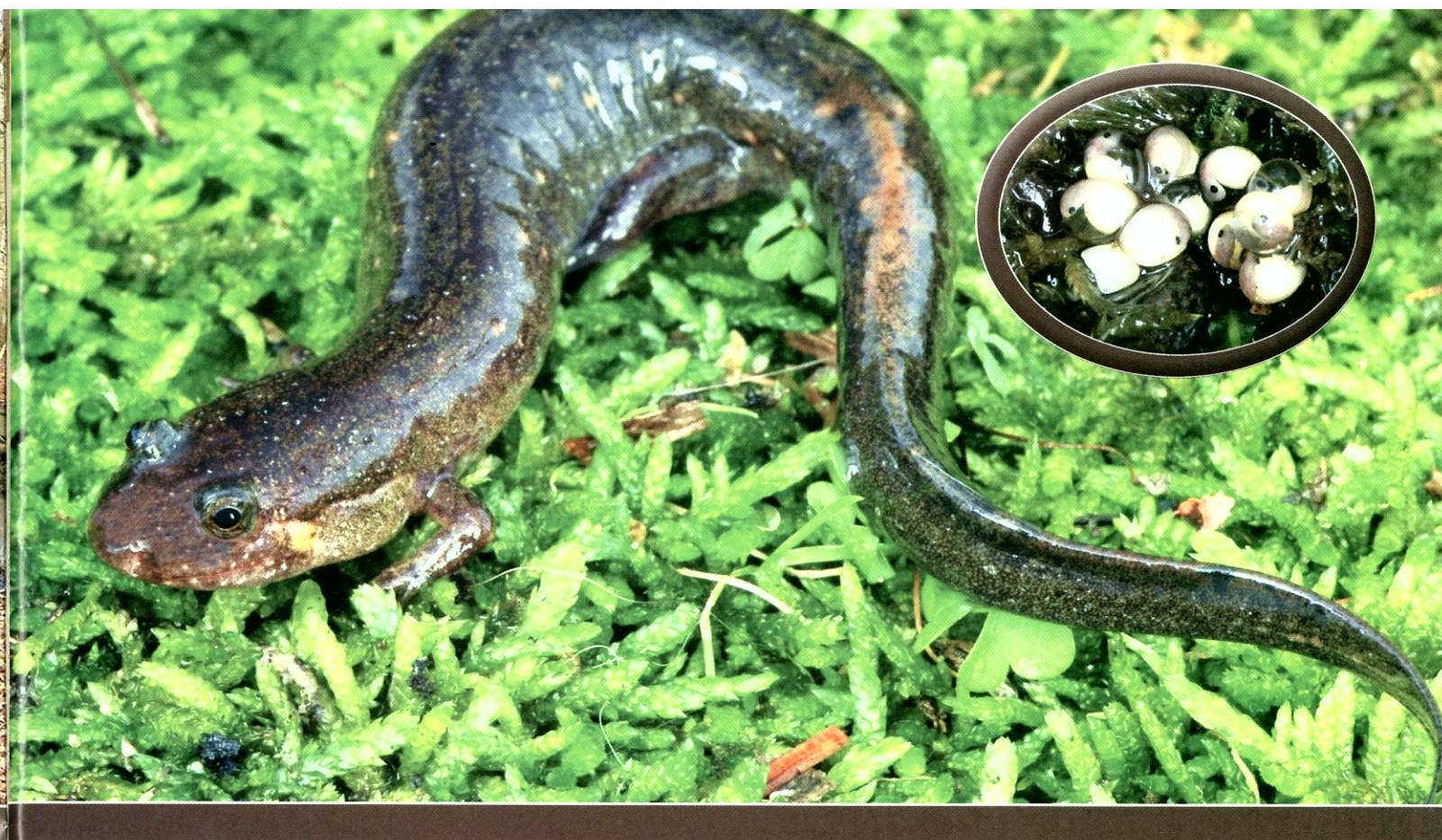
through this season, particularly here in the South, where winter's cruelty is far less harsh than it is for our neighbors to the north.

Throughout the South, many species of amphibians muster forth to mate, lay eggs and renew their populations when winter rains fill temporary ponds and other wetlands. In hillside seepage wetlands, several species of salamanders find the winter season to be just perfect for procreation, depositing eggs under leaves, woody debris or in crevices under a small stream bank. In South Carolina the ritual of winter breeding among amphibians can begin as early as October and peaks during February and early March, but it may drag on into early April as “winter breeders” take advantage of early spring rains for one last fling.

The news that many amphibian species breed at a time of year we humans typically associate with inactivity is surprising to many, but you would only

need to visit a flatwoods pond or Carolina bay, freshly filled by winter rain, on a mild February night to be convinced. The chorus of male frogs “advertising” for potential mates can be both diverse and deafening. In fact, one prominent group of winter-breeding frogs bears the name *chorus frogs*, no doubt from their penchant for congregating in large numbers at such sites. An assortment of trills, croaks, grunts and peeps might issue forth from one of these ponds, marking it as one used by a number of species.

The rush to cold-weather reproduction among amphibians may actually begin as early as October, when the common marbled salamander and the rare (federally threatened) flatwoods salamander migrate to ponds, which may be otherwise empty at that time of year. This somewhat odd behavior has a simple explanation, related to the reason that temporary ponds are prime amphibian breeding sites in the first place. Being temporary, as the name implies, these ponds fill and dry with rainfall cycles. Because of that, they typically don't have fish living in them. The lack of fish,



Different species of dusky salamanders occur throughout South Carolina in a variety of habitats, including seepage wetlands, small streams and floodplains. Like red salamanders, the females of some species of dusky salamanders deposit their eggs (inset) in seeps and streams under woody debris during fall and “guard” them, staying with the nests until they hatch. Larval dusky salamanders will often be present in seeps and springs during the winter.

which will eat amphibian eggs and larvae, makes these ponds perfect breeding sites for many amphibians, some of which, like the marbled and flatwoods salamanders, will breed nowhere else. Scientists who study these salamanders believe that entering a dry pond, laying your eggs in a clump of sphagnum moss, under a moist log, or in a crayfish burrow, then waiting for rain to fill the pond is an adaptation to assure that your eggs are in a fish-free pond.

When it's cold out, most humans limit their time outdoors and dress warmly to conserve heat. So it's confusing for us to think that “cold-blooded” animals, like amphibians, would not only be active but actually reproducing at a time when we're limiting our outdoor activities. Of course amphibians aren't really cold-blooded, they are “ectothermic,” which is just a fancy way of saying that, unlike birds and mammals, they cannot internally regulate body temperature. Amphibian body temperatures are generally the same as their surrounding environment, and a surprising number of amphibians do quite well when temperatures

are low. In fact, many amphibians obtain a lot, if not all, of the oxygen they require through their skin, which acts somewhat like a fish's gills. Cold water typically contains higher levels of oxygen than warm water, making respiration more efficient for amphibians in cold water. It's also a good thing for their larvae!

When late-fall and early-winter rains fill dry ponds and other wetlands, they jump-start a cycle of events that has been going on for thousands of years. The dead grasses, leaves and plants in the formerly dry ponds become detritus, a source of food for untold numbers of tiny aquatic creatures. Algae grow, slowly at first, on the stems of dead plants and on the detritus. This is the beginning of the food web in this wetland, and the larvae of winter breeders will take full advantage. Salamander larvae, active predators, will hunt by night for the tiniest of creatures and frog larvae—tadpoles—graze on algae and the new plant growth. 🐸

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